sponds to such changes far more quickly. Hence it is particularly well suited for use in a photophonic receiver. It is found advantageous to enclose the selenium cell in an exhausted glass bulb, like that of an ordinary glow lamp.

In order that the apparatus may be serviceable when the atmosphere is too misty, or the distance too great, to admit of the transmission of speech, Mr. Ruhmer has provided an arrangement for telegraphing audible Morse signals to the receiving station. The microphone is taken out of the circuit, and an automatic current interrupter, or "buzzer," inserted in its place. When this is operating, the arc emits a loud continuous note, which can be broken up into periods corresponding to dots and dashes by a simple key in the primary circuit. Such signals are plainly heard in the receiving telephone when speech would be inaudible, and the device is superior to the heliograph in that the signals may be made more rapidly, and cannot possibly be detected by parties for whom they are not intended.

It is said that the whole of the apparatus here described is now being manufactured commercially by a leading firm in Germany.

SHELFORD BIDWELL.

NOTES.

THE centenary of the death of Immanuel Kant was celebrated on February 12 by the University and the town of Königsberg, in the presence of the Prussian Minister of Education, Dr. Studt, and various representatives of German academic corporations. A short article inspired by the occasion appears elsewhere in this issue. The proceedings began, says the Berlin correspondent of the *Times,* with the unveiling of a memorial tablet by Dr. Studt, who delivered a message from the Emperor William, and referred in the course of an address to the services which Kant had rendered to learning and to the world. The Minister further announced that he had assigned a sum equal to 500*l.* from the public resources at his disposal in support of the teachers' aid fund. The town of Königsberg has devoted a similar sum to the foundation of an annual prize for essays on philosophical subjects. On the memorial tablet which was unveiled on the wall of the Royal Castle in the Kantstrasse is inscribed the well-known saying of Kant:—"The starry sky above me, and the moral law within me." In commemoration of this anniversary a special meeting of the British Academy was held on Friday, and a paper upon Kant's work and influence was read by Dr. Shadworth Hodgson.

SOME considerable rearrangements have been made in the museums at the Royal Botanic Gardens, Kew. A new gallery 130 feet long by 16 feet wide at the back of museum No. iii. was opened on February 1. To this the entire collection of Gymnosperms (Conifers, Cycads and Gnetaceæ, including Welwitschia) has been transferred. The space in museum No. i. thus set free has been utilised in making a more effective display of its contents, which had become very crowded. The well-lighted wall-space in the new gallery has enabled the collection of maps and plans of the establishment at various periods to be brought together. Several of these have been contributed by H.M. the late Queen and by H.M.'s Office of Works, and are of considerable historical interest. A set of the fine photographs of Kew in its various aspects which were sent by the Government to the Paris Exhibition of 1900 are also shown, as well as an extensive series of photographs of coniferous trees in their native countries.

THE eighth International Geographical Congress, which will meet at Washington, D.C., in September next, will be the first international meeting of geographers in the western hemisphere. The congress will convene in Washington on Thursday, September 8, in the new home of the National Geographic Society, and will hold sessions on September 9 and 10, the latter under the auspices of the Geographic Society of Baltimore. Leaving Washington on September 12, the members, associates and guests of the congress will be entertained during that day by the Geographical Society of Philadelphia, and on September 13, 14 and 15 by the American Geographical Society in New York, where scientific sessions will be held; on September 16 they will have the opportunity of visiting Niagara Falls (*en route* westward by special train), and on September 17 will be entertained by the Geographic Society of Chicago; and on September 19 and 20 they will be invited to participate in the International Congress connected with the World's Fair in St. Louis. The subjects for treatment and discussion in the congress are classified as follows:—(1) Physical geography, including geomorphology, meteorology, hydrology, &c.; (2) mathematical geography, including geodesy and geophysics; (3) biogeography, including botany and zoology in their geographic aspects; (4) anthropogeography, including ethnology; (5) descriptive geography, including explorations and surveys; (6) geographic technology, including cartography, bibliography, &c.; (7) commercial and industrial geography; (8) history of geography; (9) geographic education. All correspondence relating to the congress and all remittances should be addressed, The Eighth International Geographic Congress, Hubbard Memorial Hall, Washington, D.C., U.S.A.

THE death is announced of M. Firmin Bocourt at the age of eighty-five years. M. Bocourt was formerly curator of the Paris Museum of Natural History, and during his life took part in important expeditions to Siam, Mexico, and to Central America.

THE *British Medical Journal* announces that the Senatus Academicus of the University of Edinburgh has awarded the Cameron prize in practical therapeutics to Prof. Niels R. Finsen, of Copenhagen, in recognition of his pioneer work in connection with the application of light rays to the treatment of disease.

AT the jubilee meeting of the Royal Scottish Arboricultural Society held in Edinburgh on Tuesday, a resolution was agreed to expressing the opinion that the Board of Agriculture should now take steps to give effect to the recommendation of the departmental committee on forestry, so far as Scotland was concerned, by providing an estate to serve as a State forest demonstration area, and also by providing experimental plots in connection with Edinburgh University. The motion also expressed the view that forestry education in the country would not be adequately provided for until these facilities were provided and a thoroughly equipped forestry school was established in Scotland.

ON Tuesday next, February 23, Mr. F. Foxwell will deliver the first of three lectures at the Royal Institution on "Japanese Life and Character," and on Thursday, February 25, Prof. H. L. Callendar will commence a course of three lectures on "Electrical Methods of Measuring Temperature." The Friday evening discourse on February 26 will be delivered by Mr. Alexander Siemens, his subject being "New Developments in Electric Railways"; on March 4 by Prof. W. Stirling, on "Breathing in Living Things"; and on March 11 by Prof. F. T. Trouton, on the "Motion of Viscous Substances."

AT the fourth monthly dinner of the London Chamber of Commerce on February 10, a discussion took place on "British Industrial Neglect of Applied Science." Sir Arthur Rücker occupied the chair; and in opening the debate said it was no doubt true that there had been in the past a certain want of appreciation on the part of English commerce, of that careful scientific training for those who were to take the leading parts in it, which was characteristic of education in some other countries. They had to ask themselves why it was that in this country the trained university man was not in the same demand in industrial circles as he was, for instance, in America; why it was that the right article was not asked for; and whose was the fault that it was not supplied. The matter of crucial importance was the fact that it was absolutely necessary to draw the educationist and the business man closer together. Among the subsequent speakers were Sir William Anson, Sir William Ramsay, Prof. Armstrong, and Prof. Meldola.

IN connection with the centenary of the Royal Philosophical Society of Glasgow, Mr. G. T. Beilby delivered a lecture on "Advances in Chemical Industry during the Nineteenth Century" in the hall of the society on February 10. Summing up the position of chemical industry, Mr. Beilby remarked that it was evident that its widely international character, and its close touch with the most recent advances in chemistry, physics, engineering, and even with certain branches of biology, was making the position of its leaders a more and more exacting one. It was therefore imperative that the men who were to take the lead in the immediate future should be prepared with an equipment which would enable them to work, either in alliance or in competition, with the best men of any other nation. Referring to Mr. Chamberlain's recent injunction to the financiers in the City of London "to think Imperially," Mr. Beilby proposed to his fellow-workers in applied science that they should strive "to think scientifically and internationally," in order that they might be prepared to measure themselves, not against the men of any narrow class or nationality, but against the best workers of the world.

THE Great Northern and City Railway was opened to traffic at the beginning of this week. We gave a few particulars of this new tube on the occasion of its completion a few weeks ago. Certain alterations in connection with the signalling arrangements which were required by the Board of Trade had, however, to be made before the railway could be thrown open to the public.

A CORRESPONDENT sends us a cutting from the *Homeopathic World* of January 1 in which it is stated that Prof. Wm. Harvey King, of New York, and Mr. Hammer have found that if a tube containing radium is immersed in water for a time, the water becomes radio-active and is capable of affecting a photographic plate. Prof. King is said to be testing the therapeutic value of water that has thus been subjected to the action of radium.

IN NATURE of October 22, 1903 (vol. lxviii. p. 599), a peculiar kind of lightning was described by Prof. W. H. Everett, its remarkable feature being that it ascended in rocket fashion from a cloud into clear sky. Referring to the observations of flashes of ordinary character described by Mr. W. A. Lee in NATURE of January 7 (p. 224), Prof. Everett writes to say there could be no mistake about the rocket-like flashes seen by Prof. P. Bruhl and himself. Prof. Bruhl, in confirming the observations, says:—"The three main characteristics of those flashes were that they were unbranched, that they passed upwards into the clear sky, and, what is probably connected therewith, their duration was undoubtedly longer than that of ordinary flashes."

A MEETING of the Nagri Sabha, Benares, for the compilation of an authoritative Hindi dictionary of scientific terms was held, the *Pioneer Mail* states, early in January. The glossaries prepared by the Sabha of the mathematical, the astronomical, the philosophical, and the chemical terminologies were revised and finished. The revision of the first three was, comparatively, an easy task, on account of the existence of suitable Sanskrit equivalents, but the discussion on the chemical glossary was more protracted. Most of the English names of elements were adopted with slight Hindised forms, as, for instance, *Karb* for carbon, *Sphur* for phosphorus. The committee could not come to an agreement as regards a suitable Hindi term for oxygen. More than seven names were suggested, but each one was considered unsuitable and was rejected. It was finally resolved to consult Drs. J. C. Bose and P. C. Rây, of Calcutta, and Prof. Deshmukh, of Bombay, on the point.

THE report of the medical officer of health for the City of London for the six weeks ending December 31 is mainly occupied with a review of the fourth report of the Royal Commission on Sewage. Dr. Collingridge is in general agreement with the remedial measures there suggested for dealing with polluted shell-fish, but considers that the controlling authority for the Thames should be the Corporation of London as Port Sanitary Authority so far as their jurisdiction over the river now extends. The remainder of the report contains the statistical data and records of the seizures of sewage-polluted shell-fish.

IN addition to the articles of a more technical character in the December (1903) number of the *Johns Hopkins Hospital Bulletin* (vol. xiv., No. 153), Dr. C. A. Herter writes pleasantly of the influence of Pasteur on medical science. He remarks that the most significant feature perhaps of Pasteur's contributions to medicine is their direct dependence on the principles of physics and chemistry, and that sound medicine must rest on sound biological conceptions. It is also announced that it is proposed to found a memorial to Major Walter Reed, to whom in a large degree is due the discovery of the mode in which yellow fever is spread by the mosquito.

OF new journals there would seem to be no end, two of the latest additions being the *Archivio di Fisiologia*, edited by Prof. Fano, of Florence, and the *Journal of Infectious Diseases*, edited by Dr. Hektoen and Mr. Jordan. The former will deal especially with experimental physiology. The *Journal of Infectious Diseases* has been established in connection with the Memorial Institute for Infectious Diseases, Chicago, by the munificence of Mr. and Mrs. Harold F. McCormick. It will be devoted to the publication of original investigations dealing with the general phenomena, causation and prevention of infective diseases. The first number (January) is a volume of 200 pages, excellently printed and well illustrated, and contains a number of papers of considerable interest and value, *e.g.* the cultivation of *Trypanosoma Brucei*, by Messrs. Novy and McNeal; spotted fever, by Messrs. Wilson and Chowning; a study of thyrotoxic serum, by Mr. Portis; changes in the bacterial flora of sewage, by Messrs. Winslow and Belcher, &c.

AN addition to the fragmentary information now existing concerning the life of Nicolò Tartaglia is discussed by M. V. Tonni-Bazza in the *Atti dei Lincei*. Tartaglia, who died in 1557 at the age of fifty-seven, is best known to modern mathematicians for the part he played in the resolution of the cubic equation, and the document in question is an application for the copyright of the work which Tartaglia issued in 1546 entitled "Quesiti et inuentioni diverse."

THE *Bulletin* of the French Physical Society contains a preliminary account of the work of the French Geodetic Expedition which was sent out in 1901 to measure a new base line in the region of the Andes. In addition to this work the expedition has undertaken a series of measurements of the intensity of gravitation at Riobamba (altitude 3000 metres). These observations confirm Bouguer's formula for reduction to sea-level, which takes account not only of the altitude, but also of the attraction of the underlying stratum of earth. If, following the views of certain geodetists, the correction due to the second cause is omitted, discordant results are obtained.

THE last addition to the " Manueli Hoepli " is a pocket-book on the mathematical theory of elasticity by Prof. Roberto Marcolongo, of Messina. The book is written for students who have received a general preliminary training in the methods of higher mathematical analysis; at the same time the introduction of the subject of elasticity proper is preceded by two chapters dealing with harmonic functions, the theory of the potential, Green's, Gauss's and Dirichlet's theorems and allied matters. The book should afford an excellent introduction to the general theory of the equations of elasticity; for the discussion of special problems the reader is referred to the larger treatises on elasticity.

THE February number of *Knowledge and Scientific News* gives an account of what appears to be the first successful achievement of artificial flight, by Messrs. Orville and Wilbur Wright. That these brothers have been successful in gliding experiments performed under gravity is well known, but they now appear to have succeeded in raising themselves from the ground by a motor-driven machine which, after running along a mono-rail for 40 feet, rose into the air, and was driven in the face of a gale blowing at about 25 miles an hour, with a velocity of about 10 miles an hour relative to the ground, or 35 miles an hour relative to the wind. In the last trial the machine flew half a mile relative to the air, or 852 feet relative to the ground. It is sincerely to be hoped that this success will not, as in so many previous instances, be followed by a fatal accident.

A BIOGRAPHICAL notice of Prof. Angelo Maffucci, whose death on November 24 has already been noted, is contributed to the *Atti dei Lincei* by Signor Foà. Maffucci was born at Calitri, in the province of Avellino, on October 17, 1847, and his family, being farmers, naturally wished him to become either a farmer or a priest, but he preferred to go to Naples and study medicine. In 1873 he gained a medal for his campaign against the cholera, and some time later he became assistant in the Institution of Pathological Anatomy under Prof. von Schrön. In 1882 he was appointed professor of pathological anatomy at Catania, and in 1884 was elected to a chair at Pisa, which he held until his death. His most important work dealt with the infection of the embryo by the tubercle bacillus, as bearing on the heredity of tuberculosis. He received the Balbi-Valier prize of the Venetian Academy and the gold medal of the Società dei Quaranta (Society of the Forty). When near his death he proposed to found a scholarship in pathological anatomy at Pisa.

IN the first part of vol. lxxvi. of the *Zeitschrift für wissenschaftliche Zoologie* Prof. E. Rohde continues the account of his investigations into the structure of the organic cell. A second article, by Mr. A. Kölliker, is devoted to the development and origin of the vitreous humour of the eye, the author arriving at the conclusion that this structure, although essentially of ectodermal origin, in the course of its development includes certain mesodermal elements. The remaining contents of this part include an account of the " Tömösvarysche organ," found at the base of the antennæ of myriopods, by Dr. C. Hennings, and an article, by Mr. C. Thesing, on spermatogenesis in cephalopods.

" CURRENT Misconceptions in Natural History " is the title of an article by Mr. J. Burroughs in the February number of the *Century Magazine,* in which the author deprecates the popular tendency to invest animals with human attributes and human modes of thought. Especially is the author convinced that animals do not consciously teach their offspring, urging the improbability of their being able to reflect upon their future any more than upon their past, or that they are solicitous about the future well-being of their young any more than about their own ancestry. With great fairness Mr. Burroughs quotes, however, a letter from President Roosevelt in which somewhat opposite opinions are expressed, the President stating his belief that " there is a large amount of *unconscious* teaching by wood-folk of their offspring." Possibly, as the author states, the divergence of view is largely owing to the difference in meaning attached by the two writers to the same words.

THE *Rapid Review*—a new magazine issued by Messrs. C. Arthur Pearson, Ltd.—contains three pages dignified by the title " The Science of the Month," in which extracts are given from published articles on the physiology of fatigue, plants and anæsthetics, and cancer, and from reports of Prof. Lankester's Royal Institution lectures on extinct animals.

MESSRS. SWAN SONNENSCHEIN AND CO., LTD., have published the " Public Schools Year Book " for 1904. This useful work of reference was founded by three public school men representing Eton, Harrow, and Winchester, and the present is its fifteenth year of publication. Among important additions to the current issue are sections dealing with the education of engineers and musicians. The annual has become indispensable to parents sending their boys to a public school, and to the masters in such institutions.

A SEVENTH edition of " Dynamo-Electric Machinery," by Prof. S. P. Thompson, F.R.S., is being published by Messrs. E. and F. N. Spon, Ltd. With the development of the subject it has become necessary to divide the work into two parts. Part i. of the new edition has been issued, and deals only with machinery for continuous currents. The concluding part, describing machinery for alternating currents, is in the press, and is expected to appear during the present year. Chapters on dynamo design, which were published in 1902 as a separate book, are now embodied in the present work.

WE are asked to announce that the preliminary work for the Technolexicon of the Society of German Engineers must be concluded by Easter of this year, so collaborators are requested to send in all outstanding contributions. This universal technical dictionary for translation purposes, in English, German, and French, the compilation of which was begun in 1901, has received help up to the present time from 363 technical societies at home and abroad; 51 of these are English, American, South African, &c., 274 German, Austrian, and German-Swiss, and 38 French, Belgian, and French-Swiss societies. No less than 2573 firms and individual collaborators have promised contributions to the dictionary. Communications referring to the dictionary should be addressed to Dr. Hubert Jansen, Berlin (NW. 7), Dorotheenstrasse 49.

A RECENT number of the *Comptes rendus* contains an important paper by Prof. Becquerel on the light emitted spontaneously by certain salts of uranium. The light emitted is out of all proportion to the feeble radio-activity of the salts, and is most marked in those salts which phosphoresce most brilliantly when exposed to light. In the case of the double sulphate of uranyl and potassium, it was found that whilst different specimens varied in phosphorescent and luminescent power, the light emitted was the same, whether the salt had been kept in the dark during eight years or had been recently exposed to the light of an arc or to the radiations of radium salts. It is of interest to note that the author is of opinion that the study of uranium and thorium would have led, though perhaps somewhat slowly, to the recognition of most of the facts which have been brought to light by the investigation of radium and polonium.

IN the *Sitzungsberichte* of the Prussian Academy Prof. Richarz and Dr. Schenck direct attention to some very striking "analogies between radio-activity and the behaviour of ozone." Freshly prepared ozone and ozone that has been decomposed by deozonisers have the power of causing condensation in a steam jet, and impart conductivity to the air in a similar manner to those metallic salts which emit Becquerel radiation. The photographic effect of radio-active substances has also been observed in the case of ozone, and although it does not act upon barium platinicyanide or zinc oxide, it causes hexagonal zinc blende to fluoresce brightly, and this is regarded as evidence that massive ions are produced comparable with the α rays of radium and the canal rays of the vacuum tube. Platinum that has been in contact with ozone exhibits induced radio-activity, and it is suggested that the slight conductivity normally observed in the atmosphere and certain of the effects produced by radio-active bodies may perhaps be due to the formation and decomposition of ozone or hydrogen peroxide.

AN ingenious apparatus for measuring the electrical conductivity of aqueous solutions at high temperatures is described by Messrs. Noyes and Coolidge in the *Zeitschrift für physikalische Chemie*. The conditions to be satisfied were that the vessel should withstand, without leakage, pressures up to the critical pressure of water, that the lining of the vessel should be entirely unacted on by aqueous solutions, that the electrodes should be efficiently insulated from the walls of the vessel at temperatures exceeding 300° C., and that the temperature should be maintained constant within 0·1° C. The desired result was accomplished by using a steel bomb lined with platinum and closed by a washer of pure gold wire. The electrodes were of steel covered with platinum foil, and were bolted into the top and bottom of the bomb, from which they were insulated externally by means of mica and internally by means of rings of quartz-crystal made tight by gold washers. The whole apparatus was heated in a vapour bath, and conductivity measurements could be made with an accuracy of 0·25 per cent. up to 300° C., whilst the fouling of the solutions was inappreciable even at 1/2000 normal.

THE additions to the Zoological Society's Gardens during the past week include a Bonnet Monkey (*Macacus sinicus*) from India, presented by Mr. F. Glockler; two Yellow-winged Parrakeets (*Brotogerys virescens*) from Brazil, a Senegal Parrot (*Poeocephalus senegalus*) from West Africa, two Golden Eagles (*Aquila chrysaëtus*), European, presented by Mr. Charles E. Lister; a Royal Python (*Python regius*) from West Africa, presented by Mr. Cecil T. Reaney; a Simpae Monkey (*Semnopithecus melanophus*) from Sumatra, an Indian Brush-tailed Porcupine (*Atherura fasciculata*) from Siam, a Great-billed Weaver-bird (*Ploceus megarhynchus*) from India, deposited.

OUR ASTRONOMICAL COLUMN.

EPHEMERIS FOR THE MINOR PLANET (7), IRIS.—The following is an extract from an ephemeris for the minor planet Iris published by Dr. J. Riem in No. 3926 of the *Astronomische Nachrichten*. It will be remembered that Prof. Wendell recently announced the discovery of a variation in the brightness of this planet, having a range of 0·5 to 1·0 magnitudes:—

1904		α			δ		log r	log Δ
		h.	m.	s.	°	′		
Feb.	17	6	36	26	+17	41·5	0·332	0·136
,,	21	6	37	12	+17	41·3	0·334	0·150
,,	25	6	38	30	+17	41·1	0·336	0·164
,,	29	6	40	19	+17	40·9	0·338	0·179
Mar.	4	6	42	36	+17	40·4	0·340	0·194
,,	8	6	45	17	+17	39·6	0·342	0·208

Magnitude, February 5 = 7·9, March 8 = 8·5.

OBSERVATIONS OF MARS DURING 1903.—The general results of the observations of Mars made by Mr. Denning during 1903 are published in No. 3926 of the *Astronomische Nachrichten*. A 10-inch reflector with powers of 252, 312, 332, 450 and 488 was used, and the power 312 was found to be the most effective.

The streaks, or canals, on the planet's surface appeared to be, without doubt, objective features, but no "doubling" was observed. Decided changes were observed to take place in the appearance of some of the markings, but Mr. Denning attributes these apparent changes to the drifting of vaporous condensations over the permanent markings rather than to any real modifications of the latter. Many brilliantly luminous areas were observed, and although they exhibited decided changes, Mr. Denning believes them to be permanent features, and urges that more definite observations of their latitudes and longitudes should be made and recorded. A curious feature of these bright markings is that they appear brighter when on the edge of the planet's disc than they do at its centre, behaving, in this respect, like faculæ on the sun's disc. One rotation period for the planet satisfies the observations of all the markings, thus proving them to be definite features of the planet's surface rather than drifting vapours such as are seen when observing Jupiter and Saturn.

Comparing the recent results with those obtained in February, 1869, Mr. Denning has determined the rotation period of Mars to be 24h. 37m. 22·7s. As this is the mean of 12,136 rotations, it should be a very accurate value. Six drawings of the Martian surface, made on different dates during 1903, accompany Mr. Denning's communication.

A CATALOGUE OF 829 SOUTH POLAR STARS.—No. 21 of the *Contributions from the Observatory of Columbia University* is devoted to a catalogue of 829 stars, all within 2° of the South Pole, compiled by Prof. Harold Jacoby, acting director of the observatory.

The star places in the catalogue have been obtained from measures of twelve plates taken at the Cape Observatory. Four of these plates overlap and cover the region within 1° of the pole; the remaining eight contain regions symmetrically arranged about the inner four at different hour angles, so that they cover the whole region within 2° of the pole. In measuring these plates the star places, as determined from each plate, were corrected for refraction, &c., and then plotted on one large chart, so that the unknown stars common to any two or more plates overlapped. The effects of errors of observation, and the uncertainty due to the possibly different scale-values of each plate, were then eliminated, and the whole chart was oriented from the known positions of some of the included stars as determined by Sir David Gill at the Cape Observatory. The relative positions thus determined should be very accurate, and are given in the catalogue for the epoch 1895, together with